

Influence of Postpartum Propylene Glycol Supplementation on Metabolism, Animal Health, Reproductive Performance and Production in Dairy Cows

M. Iwersen, DVM; U. Falkenberg, PhD.; R. Voigtsberger; W. Padberg, DVM; A. Mertin, DVM;
W. Heuwieser, Professor

Free University of Berlin, Clinic of Reproduction, 14163 Berlin, Germany. www.tiergyn.de

Introduction

The effect of postpartum supplementation of 300 g propylene glycol (Propy) per cow per day via a total mixed ration (TMR) on metabolism, animal health, reproductive performance and milk production was studied on a commercial dairy farm (production average 10,584 kg/yr) in Mecklenburg-Vorpommern, Germany.

Materials and Methods

A total of 257 multiparous Holstein-Frisian cows were enrolled in a randomized and controlled field study. On the basis of expected calving date and previous milk production animals were blocked and allocated to one of the two treatment groups. The ration fed in group 1 (Control, n=131) was supplemented with propylene glycol (300 g per cow and day) before offering it to group 2 (Study, n=126). The TMR, containing (in weight % dry matter) 49.5% corn silage, 8.8% alfalfa silage, 5.5% grass silage, 7.2% soybean meal, 7.2% rape forage cake, 7.1% wheat, 5.9% corn meal, 2.8% brewer's grain, 1.5% barley straw, and 1.4% fat and minerals, was mixed and offered twice daily for a period of 40 days post partum. Blood samples were collected within 12 hours after parturition, on day (D) four, ten (D10±2), twenty (D23±3) and forty (D37±4). Samples were centrifuged and serum was stored at -20 °C until analysis. Body Condition Score (BCS) and Back Fat Measurement (BFT) values were recorded on the same days. Serum samples were shipped to one commercial laboratory for the determination of Nonesterified fatty acids (NEFA), Betahydroxybutyrate (BHBA), Triglycerides, Ketone bodies, Bilirubin, Glucose, Insulin and activities of Aspartate-aminotransferase (AST), Glutamate-dehydroge-

nase (GLDH), Alanine-aminotransferase (ALT) and γ -glutamyl-transferase (GGT). Metabolic parameters were analysed by a 6-step UNIANOVA with repeated measurements using SPSS®-Software.

Results

ALT, GGT, GLDH, Insulin, Bilirubin and Glucose were comparable between the two groups. Concentrations of AST, Triglycerides, BHBA, Ketone bodies and NEFA were significantly ($p < 0.05$) influenced by treatment. Concentration of AST, Triglycerides, BHBA and Ketone bodies indicated a better metabolic situation, especially on day four, ten and twenty post partum for cows treated with propylene glycol compared to the control group. Referring to the test day results from the local dairy herd improvement association (Landeskontrollverband Mecklenburg-Vorpommern) the total yield of fat corrected milk (FCM, 4%) did not significantly differ between the two treatment groups within 305 days post partum (Study 10,889 kg vs. Control 10,875 kg). Also milk composition was not affected by treatment. Neither reproductive performance nor changes of BCS or BFT during the study period were significantly influenced by treatment.

Significance

Although indicators of metabolic status were improved by postpartum use of propylene glycol, economic benefits are questionable for dairy farms with good management programs as the most important economic factors milk production and milk composition were not influenced by supplementing Propy in a TMR fed post partum.